

Exercise 24

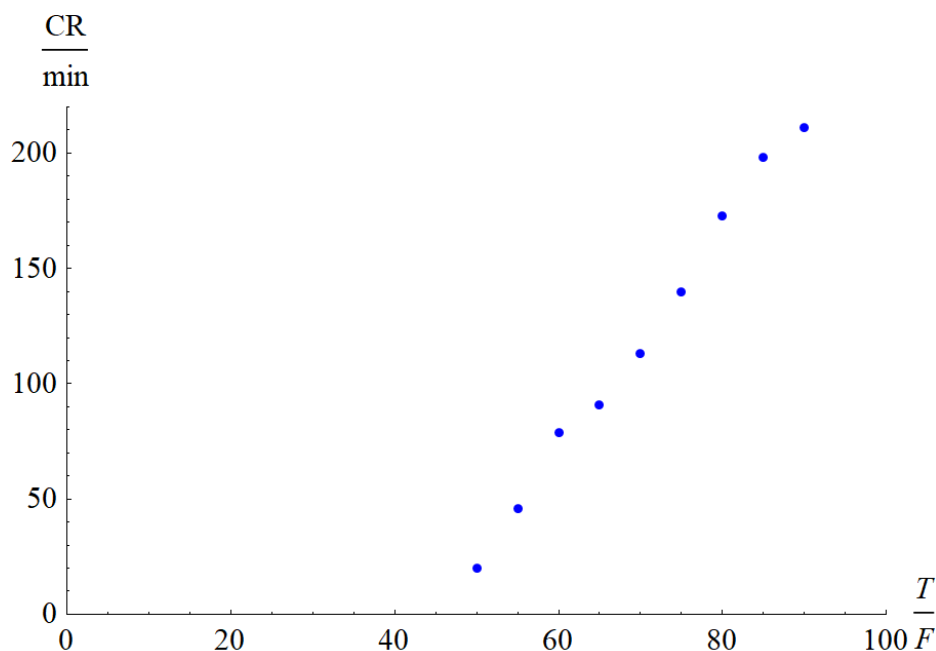
Biologists have observed that the chirping rate of crickets of a certain species appears to be related to temperature. The table shows the chirping rates for various temperatures.

- Make a scatter plot of the data.
- Find and graph the regression line.
- Use the linear model in part (b) to estimate the chirping rate at 100°F .

Temperature ($^\circ\text{F}$)	Chirping rate (chirps/min)	Temperature ($^\circ\text{F}$)	Chirping rate (chirps/min)
50	20	75	140
55	46	80	173
60	79	85	198
65	91	90	211
70	113		

Solution

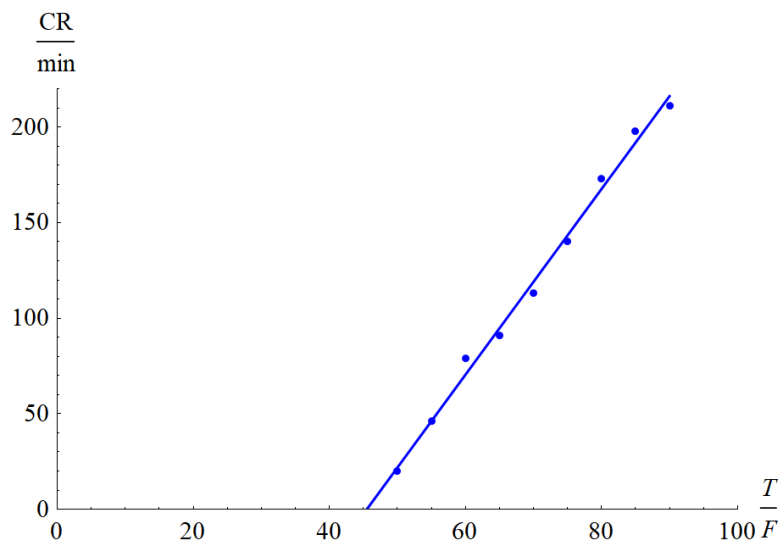
A scatter plot of the provided data is shown below.



A linear model is appropriate here because the points appear to be on or near a line. Using Mathematica's Fit function gives

$$y \approx -220.967 + 4.85667x$$

for the least squares regression line. It's shown below with the plotted data.



Use the regression line to estimate the chirping rate at 100°F.

$$y(100) \approx -220.967 + 4.85667(100) \approx 265 \frac{\text{chirps}}{\text{min}}$$